

Amendments to the Claims:

1. (Currently amended) A method of forming a material film, comprising:
 - providing a chemical vapor deposition (CVD) chamber comprising therein a
 - 5 showerhead coupled to a gas source and a pedestal coupled to a heater, wherein said showerhead is further coupled to a radio frequency (RF) power source;
 - positioning a substrate on said pedestal;
 - heating said substrate by said heater;
 - flowing a nitrogen-containing gas into said CVD chamber, said nitrogen-containing
 - 10 gas being transported to a substrate surface of said substrate and saturatively chemisorbed onto said substrate surface;
 - shutting down said flow of said nitrogen-containing gas;
 - flowing a tantalum-containing organic metal precursor gas into said CVD chamber through said showerhead with said RF power source being off, wherein said
 - 15 tantalum-containing organic metal precursor gas reacts with said nitrogen-containing gas that are previously absorbed by said substrate surface; thereby depositing a material film on said heated substrate;
 - thereafter turning on said RF power source to output a RF power;
 - flowing an inert gas into said chamber;
 - 20 in-situ plasma treating said material film within said CVD chamber by providing said RF power to said inert gas; and
 - removing said substrate out of said CVD chamber.
2. (Original) The method of forming a material film according to claim 1 wherein said
- 25 substrate is heated to a temperature of 200~600°C by said heater.
3. (Original) The method of forming a material film according to claim 1 wherein said

substrate is heated to a temperature of 200~300°C by said heater.

4. (Original) The method of forming a material film according to claim 1 wherein said tantalum-containing organic metal precursor comprises pentakis(dimethylamido) tantalum (PDMAT) ($\text{Ta}(\text{N}(\text{Me})_2)_5$) and pentakis(diethylamido) tantalum (PDEAT) ($\text{Ta}(\text{N}(\text{Et})_2)_5$).
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5. (Original) The method of forming a material film according to claim 1 wherein said inert gas comprises argon (Ar).
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6. (Original) The method of forming a material film according to claim 1 wherein the step of in-situ plasma treating said material film uses argon plasma.
7. (Original) The method of forming a material film according to claim 1 wherein said RF power is between 50~1000 Watts.
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8. (Original) The method of forming a material film according to claim 1 wherein said CVD chamber is further coupled to a vacuum pump.
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9. (Original) The method of forming a material film according to claim 1 wherein said material layer is tantalum nitride layer.
10. (Original) The method of forming a material film according to claim 1 wherein said material layer is tantalum layer.
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11. (Currently amended) A method of forming a tantalum nitride film, comprising:
providing a chemical vapor deposition (CVD) chamber comprising at least therein a

showerhead coupled to a gas source and a pedestal coupled to a heater, wherein said showerhead is further coupled to a first radio frequency (RF) power source;

positioning a substrate on said pedestal;

heating said substrate by said heater;

5 flowing a nitrogen-containing gas into said CVD chamber, said nitrogen-containing gas being transported to a substrate surface of said substrate and saturatively chemisorbed onto said substrate surface;

shutting down said flow of said nitrogen-containing gas;

purging said CVD chamber with inert gas;

10 thereafter flowing a tantalum-containing organic metal precursor gas into said CVD chamber through said showerhead with said first radio frequency (RF) power source being off, wherein said tantalum-containing organic metal precursor gas reacts with said nitrogen-containing gas that are previously absorbed by said substrate surface; thereby depositing a tantalum nitride film on said heated substrate;

15 thereafter turning on said first RF power source to output a first RF power;

flowing an inert gas into said chamber;

in-situ plasma treating said tantalum nitride film within said CVD chamber by providing said first RF power to said inert gas; and

removing said substrate out of said CVD chamber.

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12. (Original) The method of forming a tantalum nitride film according to claim 11 wherein said substrate is heated to a temperature of 200~600°C by said heater.

13. (Original) The method of forming a tantalum nitride film according to claim 11

25 wherein said substrate is heated to a temperature of 200~300°C by said heater.

14. (Original) The method of forming a tantalum nitride film according to claim 11

wherein said tantalum-containing organic metal precursor comprises pentakis(dimethylamido) tantalum (PDMAT) ($\text{Ta}(\text{N}(\text{Me})_2)_5$) and pentakis(diethylamido) tantalum (PDEAT) ($\text{Ta}(\text{N}(\text{Et})_2)_5$).

5 15. (Original) The method of forming a tantalum nitride film according to claim 11 wherein said pedestal is further coupled to a second RF power source.

16. (Original) The method of forming a tantalum nitride film according to claim 15 wherein said second RF power source outputs a second RF power of 0~1000 Watts.

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17. (Original) The method of forming a tantalum nitride film according to claim 15 wherein said second RF power source is off during said deposition of said tantalum nitride film.

15 18. (Original) The method of forming a tantalum nitride film according to claim 11 wherein said inert gas comprises argon (Ar).

19. (Original) The method of forming a tantalum nitride film according to claim 11 wherein the step of in-situ plasma treating said tantalum nitride film uses argon plasma.

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20. (Original) The method of forming a tantalum nitride film according to claim 11 wherein said first RF power is between 50~1000 Watts.

21. (Original) The method of forming a tantalum nitride film according to claim 11
25 wherein said CVD chamber is further coupled to a vacuum pump.

22. (Canceled)

23. (Currently amended) The method of forming a tantalum nitride film according to claim [22]11 wherein said nitrogen-containing gas is ammonia gas.

24. (New) The method of forming a material film according to claim 1 wherein said
5 inert gas, said nitrogen-containing gas and said tantalum-containing organic metal precursor gas are flowed into said CVD chamber through said showerhead.

25. (New) The method of forming a material film according to claim 11 wherein said
10 inert gas, said nitrogen-containing gas and said tantalum-containing organic metal precursor gas are flowed into said CVD chamber through said showerhead.